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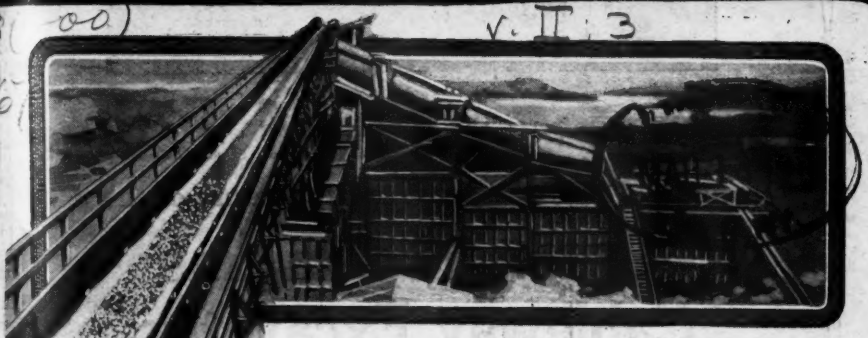

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FEBRUARY, 1918

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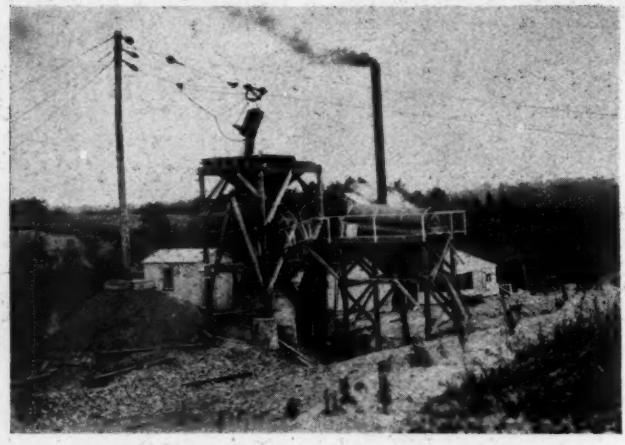

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312 S. Dearborn St. Chicago, Ill.

Manufacturers of Dragline Cableway Excavators Power Scrapers and Cableway Accessories.

Cableway Excavators, Power Scrapers and Cableway Accessories.

Pit and Quarry

Vol. 2 FEBRUARY, 1918 No. 3

U. S. GEOLOGICAL SURVEY
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If I Knew You and You Knew Me

If I knew you and you knew me,
'Tis seldom we would disagree;
But, never having yet clasped hands,
Both often fail to understand
That each intends to do what's right,
And treat each other "honor bright."
How little to complain there'd be
If I knew you and you knew me.

Then let no doubting thoughts abide
Of firm good faith on either side;
Confidence to each other give,
Living ourselves, let others live;
But any time you come this way,
That you will call we hope and pray;
Then face to face we each shall see
And I'll know you and you'll know me.

National Crushed Stone Association Is Formed

Delegates from Ten States Gather at Columbus, Ohio, January 16 and Elect Temporary Officers to Serve Until Details of Organization Are Completed at the February 7-8 Meeting in Chicago.

FOLLOWING the annual meeting of the Ohio Macadam Association, whose election of officers and business transactions took place at the association headquarters in the Hartman building, delegates from a number of states met in the afternoon of January 16, at the Chittenden hotel, Columbus, Ohio, to form a national association of crushed stone producers. Illinois, Iowa, Indiana, Missouri, Michigan, Alabama, Wisconsin and Ohio were represented.

It was not the purpose of the men to go into complete details of organization. This meeting was hastily arranged, principally by telegraph, so that a national body could be formed in order to be eligible for a place on the board of directors of the Highway Industries Association, to be formed at Chicago, January 21. The date of the meeting for the formation of a national association had previously been set for February 7 and 8 at the LaSalle Hotel, Chicago, and that meeting will be held, as scheduled, when organization will be completed.

Committees on Finance and Organization were appointed as follows: Finance, E. J. Krause of Illinois, E. T. Milligan of Indiana, H. E. Bair of Michigan, R. W. Scherer of Iowa and Wisconsin, Edward Hely of Missouri, L. H. Hawblitz of Ohio and C. E. Ireland of Alabama. Organization, F. W. Con-

THE MEN WHO ORGANIZED THE NATIONAL CRUSHED STONE ASSOCIATION
Chittenden Hotel, Columbus, Ohio, January 16, 1918

nell of Indiana, R. W. Scherer of Wisconsin, L. H. Hawblitz of Ohio, and E. J. Krause of Illinois.

TEMPORARY OFFICERS

Temporary officers were chosen as follows:

Secretary, F. W. Connell, secretary of the Indiana Crushed Stone Association, Indianapolis, Ind.

Chairman, A. J. Blair, president of the Wisconsin Crushed Stone Association.

Representative at the Highway Industries meeting, A. P. Sandles, secretary of the Ohio Macadam Association.

On the motion of L. H. Hawblitz, who is president of the Ohio Macadam Association and assistant to the president of the France Stone Company, Toledo, seconded by A. J. Sullivan, president of the Illinois Crushed Stone As-

sociation, two members are to be appointed from each state to go to Washington or any other point selected to confer with Eastern producers. These delegates are also to have full power to act in the election of permanent officers at the February meeting in Chicago.

Since many of those present intended to be on hand at the Highway Industries Association's meeting January 21, it was decided to have a gathering of the quarrymen at the Congress Hotel on the morning of the same day and before the Highway Industries sessions began. This was done, and a tentative by-laws and constitution formed, which was mailed out shortly afterwards, accompanied by the official call to the February convention, and also membership application blanks, such as is reproduced here:

CALL TO ARMS

To the Crushed Stone Industry of the United States:

The present war has brought about conditions that seriously concern the crushed stone industry. In self-defense we must organize.

At a meeting January 16, 1918, Columbus, Ohio, representatives of ten states met in conference, elected temporary officers and selected a committee to draft and submit for approval a tentative constitution for a National Crushed Stone Association.

This committee met in Chicago Monday, January 21, 1918, and after thorough discussion, begs leave to submit for your consideration and approval a constitution, printed copy of which is herewith enclosed.

Important Notice

This constitution will be presented at a meeting of crushed stone representatives to be held in Chicago February 7-8, at 10 a. m., La Salle Hotel.

Please consider this constitution carefully. When you come to Chicago on the above dates, come prepared to take definite action. There is no time to lose. Other interests and our competitors are busy at Washington and elsewhere. We must not longer remain asleep at the switch. The trend of all industrial enterprises is to get together.

"Do It Now" should be our slogan.

Respectfully,

A. J. Blair, Temporary Chairman, Milwaukee, Wis. Pres. Wisconsin Crushed Stone Asociation.
F. W. Connell, Temporary Secretary, Indianapolis, Ind. Secy. Indiana Crushed Stone Association.
A. J. Sullivan, Chicago, Ill. Pres. Illinois Crushed Stone Association.
E. B. Taylor, Indianapolis, Ind. Indiana Crushed Stone Association.
H. E. Bair, Toledo, Ohio. Michigan Crushed Stone Association.
R. W. Scherer, Milwaukee, Wis. Secy. Wisconsin Crushed Stone Association.
S. M. Hall, Mt. Pleasant, Iowa. Mt. Pleasant Crushed Stone Association.
Edw. Hely, Cape Girardeau, Mo.
L. H. Hawblitz, Toledo, Ohio. Pres. Ohio Macadam Association.
T. B. Ripy, Lawrenceburg, Ky. Kentucky River Stone Company.
A. P. Sandles, Columbus, Ohio. Secy. Ohio Macadam Association.
Committee.

P. S.—For further information address F. W. Connell, 803 Hume-Mansur Building, Indianapolis, Ind.

Application for Membership National Crushed Stone Association

Secretary National Crushed Stone Association:

Application is hereby made for membership in the National Crushed Stone Association, subject to approval and acceptance of the Board of Directors of said Association.

This application is made after the reading and full knowledge and understanding of the Constitution of this Association.

Date.....

Signed.....

Per.....

Indiana Sees Steady Improvement

Annual Meeting of Quarrymen at Indianapolis in Keeping with War Conditions—Vote to Join National Organization.

OUT OF RESPECT for war conditions the 1918 convention of the Indiana Crushed Stone Association was shortened to one day. The meeting took place at the Clay-

F. W. CONNELL
Secretary, Indiana Crushed Stone Association, Indianapolis, Ind.

pool hotel, Indianapolis, Jan. 9, with an attendance of about fifty. The banquet in the evening was shorn of its sumptuous character of former years, but withal consisted of good, plain, wholesome food in keeping with the spirit of the diners.

Patriotism pervaded every action—not the blaring, melodramatic brand, but the kind which fills the souls of strong men whose emotions are reserved for a time when hard blows must be dealt and exacting sacrifices made with a grin. Everybody now knows of the disheartening and unjust priority rulings that dealt a death blow to the road-building program, so vital to the winning of the war, in order that the manufacture of non-essentials like the ukelele, for instance, might go on uninterrupted. But things like this only strengthen the determination of the crushed stone producers to back our fighters to the limit.

F. W. Connell was again chosen secretary. This was to have been expected, for his energy and ability to get things done are known and appreciated by the quarrymen. Mr. Connell is without pomp or wasted effort. He has shown during the past year the mutual interests of those who build and use roads and those who furnish the material, by co-operation and man-to-man treatment of conditions that are usually classified as obstacles to complete harmony.

He has convinced county highway superintendents and commissioners of the earnest desire of the quarrymen to work shoulder to shoulder with the road builders to give taxpayers the best and most for their money, regardless of the type of road selected.

The discussion as to placing the association on record as favoring the movement for the formation of a national organization of crushed stone producers occupied a part of the afternoon session. Every man realized the advantages to be derived from a parent organization and the influence it would wield. By unanimous vote a motion to co-operate with any movement towards a national body was carried.

OFFICERS FOR 1918

Officers for one year were elected, as follows:

President—V. G. Pogue, president of the Spencer Stone Co., Indianapolis.

Vice President — L. H. Hawblitz, assistant to the president of The France Stone Co., Toledo, Ohio.

Treasurer—E. B. Taylor, manager of the A. & C. Stone Co., Greencastle.

Directors—O. H. Binns, manager of the Casparis Stone Co., Kenneth, Ind., and W. C. Van Adams.

Retiring President E. T. Milligan was tendered a vote of thanks for his administration of accomplishment.

At the banquet at 7 o'clock the chief speaker was A. P. Sandles, secretary of the Ohio Macadam Association. He possesses some real, convincing facts on cost and service of properly constructed and maintained macadam roads, and has the gift of eloquence to drive his statements home.

Admitting that they had been hard hit by the car shortage, yet everyone felt that the automatic cancellation of priority orders by the government's action in assuming control of the railroads would result in certain and reasonably steady improvement in shipping conditions when operations begin next spring.

V. G. Pogue

WHO SAID the age of opportunity had passed? He didn't know V. G. Pogue. A good title for this story would be "From Slip Scraper to President," for that covers the span of the seventeen years in which the evolution was brought about. Mr. Pogue is president of two big institutions, the Indiana Crushed Stone Association and the Spencer Stone Co. He resides in Indianapolis and is only thirty-three years of age.

V. G. POGUE
President, Indiana Crushed Stone Association

Although born in Illinois, the Hoosier state has given him most of his opportunities. His debut into the business world was not what could be called a momentous occasion. It demonstrated, however, that the starting point is not always of importance to the resulting success. Driving a team to a slip scraper in a gravel pit at Merron, Ind., convinced him that that was not the life and he determined to get into the white-collar-every-day class. In 1903 he entered business college and waited tables for his meals.

When the commercial school head had given him his hard-earned "dip," a glowing letter of recommendation and a hearty handshake, he started out, not to conquer the world, but to get a regular job, and held several of them in the next few years at various places. For two years he shook a speedy shorthand pencil in railroad offices and almost became a confirmed

railroader — green eye-shades, black arm bands and everything. He was rescued from such a fate by the Standard Oil Co. (now who says they are a soulless corporation), which sent him to Louisiana in construction work.

Five years ago he entered the employ of the Spencer Stone Co. as bookkeeper and has since held every executive position, being appointed president Dec. 10, 1917. Mr. Pogue has been an untiring worker for the Indiana crushed stone association and was its first secretary, during 1914. He was treasurer during the past two years and his election by unanimous vote to the presidency Jan. 9 shows that his services are greatly appreciated.

Discuss Practical Subjects

Indiana Sand and Gravel Producers Hold Rousing Meeting Despite Inclement Weather.

BELOW ZERO weather could not freeze the enthusiasm nor interrupted train service prevent the members of the Indiana Sand and Gravel Producers' Association from holding their annual convention at the Claypool hotel, Indianapolis, January 15, and making of it the best attended and most enthusiastic gathering in the history of the organization.

Indiana sand and gravel men have made their association one of the livest in the country. President George V. Miller's energy has been backed by every individual member. After a short business session, Judge W. H. Swango, of Terre Haute, delivered an interesting address on "The Trade Outlook for 1918." Luncheon followed and the producers reassembled at about 3:00 o'clock. M. E. Nicholson, state manager of the Indiana Manufacturers' Reciprocal Association, detailed methods of compensation and liability insurance under which his organization operates.

Getting down to the practical uses of sand and gravel, the report of Chairman W. P. Carmichael of the Committee on Concrete Aggregates showed that he had given much thought to the subject. Lack of space prevents recording the details of this address, but it will be more fully reproduced in the March issue. Mr. Carmichael, who is president of the Carmichael Gravel Co., at Williamsport, Ind., pointed out the limited way in which the data prepared by the experimental laboratories and technical schools have been made use of by engineers and constructors.

GEORGE S. MILLER
President, Indiana Sand and Gravel Producers' Association.

"All grades of concrete are made in a manner determined by tradition," he said, "based originally on the rule

of thumb. In nine cases out of ten engineers specify the old favorites—1: 2: 4; 1: 2½: 5 or 1: 3: 6. Engineers of undoubted technical ability and practical experience labor long and hard over the question of section and reinforcing materials and are hyper-critical in the inspection of the quality of the cement, but give little or no consideration to the proportioning materials, with the result that both proportions of mix and processes of manufacture are left in the hands of and regulated by the judgment of men whose only fitness for the work lies in a strong back and willing hands. In consequence of this loose practice, concrete is not as dependable a material as steel, and the factor of safety in design must be increased to provide for variation in its quality."

C. D. Franks, managing engineer of the Portland Cement Association, stated the necessity of uninterrupted road building during the war and set road building during the war.

OFFICERS ELECTED.

Officers for the ensuing year were elected as follows:

President—George V. Miller, Granite Sand and Gravel Co., Indianapolis.

Vice-President—M. A. Neville, Western Indiana Gravel Co., Lafayette.

Secretary-treasurer—P. A. Stewart, Kickapoo Sand & Gravel Co., Attica.

Executive committee—H. C. Huffstetter, Brown-Huffstetter Sand Co., Indianapolis; L. R. Witty, Wabash Sand & Gravel Co., Terre Haute; Abe Hart, Hart Brothers, Sandborn, and E. Guy Sutton, Carmichael Gravel Co., Williamsport.

INTERESTING TALKS AT THE BANQUET.

President Miller acted as toastmaster at the annual dinner at 6:30 o'clock. Short talks were made by John J. Griffith, Marion county road superintendent; V. G. Pogue, president, Indiana Crushed Stone Association; M. A. Neville, president of the Western Indiana Gravel Co., Terre Haute and Lafayette; J. P. Coyle, of the Consumers Co., Chicago; M. E. Noblet, secretary of the Hoosier Motor Club, and Edward Barrett, state geologist of Indiana.

The evening closed with a talk by the Indiana highway engineer, W. S. Moore, who gave a brief outline of his plans for the year. He has laid out four main market highways in the state, totaling about 800 miles, and it is the intention that 200 miles of these highways be built during the present year, all of which will be hard surfaced, permanent roads.

The law provides, he stated, that at least two kinds of paving must be submitted, and the state highway commission has gone on record that they will submit three kinds—concrete, brick and asphaltic concrete—and that these main market highways will in no instance be less than 18 feet in width. The plans are to be submitted to and the contracts awarded by the boards of county commissioners in which the roads are located, subject to the approval of the state highway engineer.

He outlined tentative specifications for sand and gravel to be used in the constructon of these roads and invited suggestions from the producers as to any changes that seemed proper to them.

Pipe Association to Meet

Two days, instead of three, as has been the custom in past, will be devoted to the 1918 meeting of the American Concrete Pipe Association at Hotel Sherman, Chicago, Ill., Feb. 8 and 9. The banquet will be held on the evening of the first day. A more compact organization and national advertising will be among the subjects up for discussion.

"MACADAM AND MAINTENANCE" THEIR GOOD ROADS SECRET

Left to Right—Allen Patterson, Lima, and A. Acton Hall, Piqua, of the Executive Committee; L. H. Hawblitz, Toledo, President; Claude C. Clark, Assistant Secretary, and A. P. Sandles, Secretary, Columbus, Ohio.

Road Building Should Not Cease

Ohio's Annual Meeting Shows Vital Importance of Good Roads to Winning of the War—Notable Speakers at Banquet.

NEVER in the history of the Ohio Macadam Association (formerly Interstate Stone Manufacturers' Association) has there been a convention approaching in importance that held at Columbus Jan. 15 and 16—and past years have seen some mighty helpful gatherings, at that. The story of the organization is a continual record of accomplishment, but the unprecedented business conditions of the present have completely disorganized hard-worked-out standards, and the meeting brought together more than a hundred men with the determination to rise above the hardships that have been imposed upon them.

These men came prepared to build anew that which had been destroyed. There wasn't a slacker in the crowd. On the afternoon of the 15th about seventy-five members—all who had been able to reach the city through the snow drifts—met at the Athletic club. Secretary A. P. Sandles presided as chairman, and soon their problems were stated for informal discussion.

This meeting was not exclusively a gathering of Ohio quarrymen, for there were delegates from several states present who came to participate in the formation of a national organization if it was found to be the desire of the stone men throughout the country to have a parent association. February 7 and 8 had been previously determined upon as the date for a meeting in Chicago to consider the national organization idea, but with the recent announcement of the plans to organize the Highway Industries Association at Chicago Jan. 21, it was the desire of the quarrymen to form a national body so as to be entitled to representation on the board of directors on the Highway association.

While labor shortage, lack of railroad cars, finances, disturbed bond

market, etc., were talked of, yet the great portion of the members' attention was centered upon the need of combining state organizations and the formation of associations in states where none exists now, so that road material men may, through a central organization, meet the wishes of official Washington by being in better position to give quickly facts and figures relative to the industry and to co-operate with the government in its road-building as a part of the war program.

Notable Speakers at the Banquet

At the banquet in the evening, also held at the Athletic club, were a number of Ohio's most distinguished men at the speakers' table and fully 200 guests facing them. Toastmaster Sandles, ripe in experience and a born leader, had occasion throughout the evening to make use of his remarkable talent and knowledge of men. His first act was to announce a one-minute's silent toast (which was really a prayer) to the boys at the front.

L. H. HAWBLITZ
President, Ohio Macadam Association

There were pathos, wit, optimism, horse-sense, warning and a hundred other human emotions brought out during the evening by the twenty-or-more speakers. The leading address was made by Dr. W. O. Thompson, president of Ohio State University. Secretary Rankin of the Ohio State Bankers' Association and a member of the Federal Reserve Board at Cleveland told of his interest in good roads, which he considered of such vital importance in winning the war that they should be classed with Liberty bonds. Members of the Supreme court, prominent educators, farmers, building and loan men and others evidenced their interest in the building of good roads.

All Officers Re-elected

At 10 o'clock Wednesday, Jan. 16, the formal annual meeting of the Ohio Macadam Association was held in the association's headquarters in the Hartman building. Committee reports were read and the election of officers for the coming year held, which resulted in the retaining of the same officers for 1918 that served during the past year, as follows:

President—L. H. Hawblitz, Toledo, Ohio.

First vice president—E. T. Paul, Lewisburg, Ohio.

Second vice president—J. A. Moore, Bellevue, Ohio.

Secretary—A. P. Sandles, Columbus, Ohio.

Treasurer—W. H. Hoagland, Columbus, Ohio.

H. H. Macdonald, who for several years has performed much good work for the National Paving Brick Manufacturers' Association, recently resigned and became secretary of the Gypsum Industries Association, with headquarters in Chicago.

Slag Men Organize

National Association Formed at Columbus, Ohio, January 16 Meeting at Which Ninety Per Cent of the Industry Is Represented.

SLAG CONCERNS, representing about 90 per cent of the slag industry, met in the afternoon of January 16 at the Chittenden hotel, Columbus, Ohio, and formed the National Slag Association. It had been the aim of the slag men to organize for the past year or two, but the action at Columbus was hastened by the necessity of having a national body in order to be eligible for representation on the board of directors of the Highway Industries Association to be formed at Chicago, January 21.

The slag men gathered in the same room vacated by the delegates from a number of crushed stone producing states, who, earlier in the afternoon, had formed the National Crushed Stone Association, and whose organization was also hurried for the same reason. A. P. Sandles, secretary of the Ohio Mecadam Association, by request of the members acted as chairman, and Claude Clark, assistant secretary of the macadam organization, served as temporary secretary.

No time was lost in getting down to "brass tacks," and every man voted "Yes" in answer to the question, "Shall we organize?" Those present were:

C. A. Luck, The France Slag Company, Toledo, Ohio.

C. E. Ireland, The Birmingham Slag Company, Birmingham, Alabama.

F. A. Sarstedt, Cleveland Macadam Company, Cleveland, Ohio.

W. D. Brewer, Duquesne Slag Products Company, Pittsburgh, Pa.

W. E. Donnellson, National Tube Company, Carnegie Steel Company, and American Steel and Wire Company, Pittsburgh, Pa.

E. H. Kuttner, Illinois Improvement and Ballast Company, Chicago, Illinois.

F. E. Miller and H. J. Love, Standard Slag Company, Youngstown, Ohio, and Buffalo Slag Company, Buffalo, N. Y.

On the motion of Mr. Ireland, the organization of the National Slag Association became a fact.

The following officers were elected:

President, F. A. Sarstedt.

Vice-president, F. E. Miller.

Secretary, H. J. Love.

Treasurer, W. D. Brewer.

The objects of the association are (1) to promote and stimulate the use of blast furnace slag; (2) to investigate and exploit its technical merits in the fields where use has already been or may further be developed for the material; (3) to collect, classify and transmit to its members all data procurable which pertains to the present or possible uses of blast furnace slag; (4) to maintain an Information and Publicity department for the purpose of presenting to engineers, architects, contractors and others interested in work where slag may be utilized, authentic data that would aid in the accomplishment of the aims of the association; (5) to so co-operate with other commercial associations, technical societies or laboratories, bureaus or other similar organizations, to the end that blast furnace slag will become recognized as a well-defined, technically desirable, standardized commercial product for use as aggregate in plain and reinforced concrete in all classes of construction, as a satisfactory railroad ballast and as a superior macadamizing agent.

National Security Impels National Co-operation

BY E. GUY SUTTON,
Secretary, National Association of Sand and Gravel Producers

The benefits to be derived by the application of co-operative principles is duly testified to by the fact that practically every form of activity, whether professional, ethical, social, commercial or industrial in its nature, has its corresponding association or society.

UNDER NORMAL conditions each trade association has been able to solve the problems and determine the general policies incident to the successful handling of the industry, even as formerly individual firms or corporations felt that they were sufficient unto themselves and that destructive rather than constructive competition was the life of trade.

However, we are now working and living under abnormal circumstances. Conditions are constantly changing; situations are arising which we had not thought possible; of the future, we cannot even speculate. The ordinary avenues for the preservation of equal rights in the conduct of our respective business affairs have closed for an indefinite period. Our worth, as firms of individuals, is calculated on the basis of our ability to give aid in performing the task which our country is dedicated to—winning the war.

It is only reasonable to suppose, however, that it is not the ultimate purpose of the government to discontinue highway construction, especially since any schemes for the conservation of food embrace the facilities for the prompt delivery of foodstuffs to the market. Besides it is manifest that the railroads are not able to handle the demands for transportation of materials and supplies, including food, and that their efforts must be supplemented by other means of handling involving the use of dependable highways.

If, however, the government agencies do not realize the extreme need for an extensive road-building program, then the matter must be energetically and persuasively brought to their attention and consideration. This cannot be done, as we all recognize, by individual appeals nor even through the activities of our respective state associations. The governmental bodies would look with disfavor upon such propaganda, because it would be a duplication of efforts to accomplish the same purpose.

Assuming that a road-building program will be formulated, as undoubtedly it will, then we must be ready as "allies" prepared to co-operate with each other and with the government authorities so that the work can be planned and prosecuted with the greatest dispatch.

In this way we will be able to use our talents, our strength and our resources as well as our productive agencies toward doing the things which we are best fitted to do.

[Editor's Note: Mr. Sutton has capably interpreted the situation. Official Washington wishes to deal with industries as a whole, rather than individuals. Every sand and gravel producer in the Union should join the Na-

tional Association and make a supreme effort to attend the national convention—your convention—February 7-8. For convenience we take pleasure in reproducing the application for membership in the National Association of Sand and Gravel Producers. Serve your government and yourself.]

Sand and Gravel Convention Speakers.

THE MEN who are to speak at the convention of the National Association of Sand and Gravel Producers at the Great Northern hotel, Chicago, Ill., February 7-8, are eminently fitted to handle their respective subjects by reason of long association in their particular fields.

C. J. Porter is an expert on liability and compensation insurance, and is resident manager of the Pacific Mutual Life Insurance Co. His subject will be "Liability and Compensation Insurance."

W. R. Webster is president of a big-capacity sand and gravel plant and is one of the best informed men in the industry on operating costs. His address, "How to Use Cost Data," will be all the more interesting because of the practical application of his own methods in his own institution, the Ideal Sand and Gravel Co., Mason City, Iowa.

W. D. Carmichael, ripe in experience and in intimate touch with the demands of building conditions, will present the extremely important subject of "Standardization and Grading."

Milton McDermott, treasurer and general manager of the Knoxville Sand and Transportation Co., Knoxville, Tenn., will be spokesman for the "Trade Relations" feature of the program.

Walter F. Jahncke, of Fritz Jahncke, Inc., New Orleans, La., is indispensable to any meeting of sand and gravel men. His talk will be "Accident Prevention."

J. C. Buckbee is an expert authority on the design of sand and gravel plants. He will speak on the subject, "Operating a Gravel Plant."

Prof. Abrams, of Lewis Institute, is known wherever there is any knowledge of conocrete construction. His subject will be "Concrete Aggregates."

H. B. Gillette, author of "Cost Data," and an engineer of many years' experience, will speak on "Cost Accounting."

B. F. Affleck, president of the Portland Cement Association, and president of the Universal Portland Cement Association, will probably choose for his subject "Trade Associations."

MR. E. GUY SUTTON, Secretary,

Williamsport, Indiana.

Dear Sir:

Enclosed herewith you will find check for $25.00 entitling the undersigned to full benefits of the National Association of Sand and Gravel Producers from date to MARCH 1, 1919.

(Firm) .....

(Address) .....

(Dated) .....

Highway Industries Meeting

WHEN THE FIRST meeting of the Highway Industries Association was called at the Congress hotel, Chicago, Ill., January 21, there were about 150 men present representing various industries having to do with road building. It had been previously announced that the organization was to have been formed to co-operate with the Government in its road-building program, since the officials at Washington prefer to deal with national organizations rather than state associations or individuals.

A meeting for the purpose of joining their states into a national association had been set by the quarrymen for Feb. 7-8, at Chicago, but since the Highway Industres Association had designated an earlier date for its gathering the stone men sent representatives to Columbus, Ohio, January 16, to meet with the members of the Ohio Macadam Association, then in session, to formally organize the national body necessary to be eligible for representation on the board of drectors of Highway Association.

This required a tremendous effort, because less than a week's time remained, but it was accomplished, principally by means of telegrams. There were ten states represented and the proposition to co-operate with the Highway Industries Association was warmly espoused, and as a result a substantial number of quarrymen came to Chicago January 21 to the Highway Industries meeting. A. P. Sandles, secretary of the Ohio Macadam Association, was appointed spokesman for the National Crushed Stone Association.

The highway meeting was divided into two sessions, between which the nominating committee retired for the selection of candidates for president and three vice-presidents.

E. Guy Sutton, secretary of the National Association of Sand and Gravel Producers, delivered a well prepared and thoughtful address which is published elsewhere in this issue. F. E. Sarstedt, first president of the newly formed National Slag Association, gave some interesting information about slag as a road materal.

Officers were chosen as follows: President, S. M. Williams, Garford Motor Truck Co., Lima, Ohio. Vice-presidents, A. R. Hurst, Lion Gardiner and S. T. Henry of New York.

The article on Membership reads as follows:

There shall be three classes of membership: (a) Organization: (b) Company: (c) Associate: (d) Subscribing.

(a) An organization member shall be a national association composed of companies, firms or individuals whose business interests embrace the construction of public highways.

(b) A company member shall be a company, firm or individual whose business interests embrace the construction or use of public highways.

(c) An associate member shall be an association or civic body not eligible for membership as heretofore provided and who may desire to cooperate with this assocaton. Assocate members shall have all the prvileges of membership except the right to vote.

(d) A subscribing member shall be anyone eligible to any of the other classes of membership. Subscribing members shall have all of the privileges of membership except the right to vote.

EDITORIAL

The Bond Market

LEGISLATION is now being drafted by administration officials in conference with members of Congress authorizing the regulation of practically all private securities. The exercise of this function would be assigned to the federal reserve board, or some agency created by it, which would also pass on the priority of capital needs.

As a collateral plan, formation of a government corporation with perhaps half-a-billion dollars in capital to absorb any of the approved stock or bond issues has been agreed upon tentatively. Governors and legislatures of all states, and county, city or other local officials will probably be called upon to cease making expenditures for public improvements not absolutely necessary to the prosecution of the war.

Steps to unify the nation's financial resources should certainly be taken to eliminate private issues of bonds, stocks and notes that compete with the government's war bonds, but the obtaining of money for road building should clearly be distinguished from that group. Road building is a war necessity, but unfortunately investors have not been brought to realize that fact, probably because government agents recently showed woeful ignorance in the application of priority orders.

Priority orders have all been automatically cancelled, and a more hopeful ray in the situation is that a number of the nation's leaders see the importance of continued road building as the means of moving food to the fighters. At Columbus, Ohio, last week, a member of the federal reserve board expressed his unqualified approval of the issuance of road building and road improvement bonds, stating that he believed these securities should be classed with liberty bonds.

The occasion was a gathering of notable men, several of whom had not given serious consideration to the importance of good roads to the war program, but who, upon coming into closer contact with the facts, unhesitatingly placed themselves on record as favoring uninterrupted road building. This condition is general, and offers work for a centralized organization, without selfish aims, whose personnel will inspire the confidence of the government and the general public and whose influence will be sufficient to secure an audience before drastic action is taken in the stoppage of necessary road work.

Car Shortage and Price

IT HAS UNDOUBTEDLY been very apparent to those who have figured the balance sheet for the past year that decreased production caused by car shortage has very materially raised their unit cost of production. In the face of the present crisis operators will have to estimate as best they can on tonnage possibilities for the future and base prices accordingly.

Our industry does not wish to profiteer by the shortage of transportation equipment and the demand for material available, as the immediate future of building will depend upon the prices of building materials very largely. It behooves every producer

and dealer in building materials to plan on as small a margin as will give him a safe return on his investment, or we may find ourselves with no market whatever.

The Motor Truck and the Times

THE USE of motor trucks for the transportation of sand, gravel, stone and kindred materials has passed beyond the pale of experiment. Their efficiency and economy have been conclusively demonstrated by users in these industries. Indeed, these users testify that their motor trucks do not cost money, but make money; that to install the motor truck simply means to add to their equipment another machine that will pay its own cost and a profit as certainly as do the other machines of their equipment.

To-day, the motor truck is an asset. In delivering the products of the pit and quarry it outdoes horse-flesh and steam, because it delivers quicker and in greater quantity than the horse, and excels steam in efficiency and economy within a reasonably short radius of delivery. The horse, despite its faithfulness, is to-day considered a liability.

Railroad transportation, with its many delays, switchings, strayings, hold-ups, etc., delivers less material in a given time within certain limits than may be delivered within the same limits by the motor truck. This is especially so at present, and the conditions incident to war hold little promise of improvement.

Motor truck manufacturers have made a special study of the requirements for handling and hauling road building and other construction materials and, with a high degree of engineering skill, have designed motor trucks for these particular duties.

Operating Costs

THERE is a tendency among many producers to GUESS, more or less, at actural operating cost. We all know what happens in this case. Such a producer obtains information as to what prices his fellow producers are obtaining for their products and he then quotes the same prices; or, thinking that the other fellow is making a larger margin of profit than is necessary; or, again, guessing that he can produce just a little cheaper than the other fellow, he shaves the price somewhat, underbidding not only his competitor, but others who actually KNOW their costs.

The man who sells below cost will eliminate himself from the race in due time, but before that time he has done very serious damage, not only to his nearest neighbor, but to all producers in the territory in which he operates. He has been the means of lowering the fair market price of materials and in order to secure their fair share of the business his competitors have undoubtedly had to meet him, and in so doing they, too, have suffered.

In cases of this kind, where a producer continues to sell below cost, it settles into a question of which of the competing firms are more able financially to stand the strain. There is no doubt that some operators can produce their tonnage at less cost than others, and by so doing are entitled to reduce their selling price, if they wish to do so, rather than pocket the additional profits which they have earned by their progressiveness, ingenuity, or such quality that enables them to lower these costs. Such are not cutting prices. They are merely profiting by their own particular ability in this line.

Know Your Costs

IN RECENT years there has been a strong tendency toward the accurate keeping of cost accounts. I say "cost" accounts because the whole object of bookkeeping is primarily to arrive at the cost of doing business. When this cost is known, the other accounts will take care of themselves. No man will intentionally sell below his actual costs for long, because the courts would soon be called in to wind up his business and pay off the creditors.

[EDITOR'S NOTE: The article which follows is one of the most important that has ever come to our attention. It particularly deals with conditions that prevail right now. Mr. Webster, general manager of a big-capacity sand and gravel plant, has shown a remarkable insight into production costs as affected by conditions. It would be regrettable, indeed, if any sand, gravel or crushed stone producer should by mishap overlook these pages.]

It is not intended to give here a detailed outline of accounting. The sand and gravel producers have accounting problems differing materially from other manufacturing enterprises; i. e., the irregularity of the producing season, owing to impossibility of operation in freezing weather, the fluctuation of the market (demand, not price), car shortage, etc. Some producers have surmounted these obstacles by installing systems of storage for surplus materials, but even with these measurers there are extra costs to be reckoned with due to extra handling. It is to be determined by the individual operators whether the increased cost incidental to maintaing storage piles is warranted by the saving produced when plant can be kept in continuous operation for the full producing season.

By W. R. WEBSTER.

General Manager, Ideal Sand & Gravel Co., Mason City, Iowa; Secretary-Treasurer of the Iowa Sand & Gravel Producers' Association, and Member of the Board of Directors of the National Association of Sand & Gravel Producers.

IN ADDITION to the above advantages, it gives the operator the ability to fill all orders regardless of the ratio of demand for the different products and also gives him a certain amount of material to be shipped after freezing weather has set in.

We have, therefore, two types of operators: those without and those with storage facilities. These need not be dealt with separately, however, as the cost of storage and reloading is merely an additional cost charge, to be reckoned with against operation without it.

There is a tendency among many producers to more or less GUESS at this actual cost. We all know what

happens in this case. Such a producer obtains information as to what prices his fellow producers are obtaining for their products and he then quotes the same prices or, thinking that the other fellow is making a larger margin of profit than is necessary; or, again, guessing that he can produce just a little cheaper than the other fellow, he shaves the price somewhat, underbidding not only his competitor, but others who actually KNOW their costs.

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Items of Cost

Owing to the conditions above outlined, it is difficult to arrive at an average daily producing cost, and the man who has not in the past been keeping these accounts will lose just another year in arriving at the correct charges. There is, first, a fixed overhead charge for every day in the year, including office salaries, depreciation and depletion, interest on investment (plant and land, or, if operating on royalty or free river deposits, on plant alone), taxes, etc. This charge must be distributed over the tonnage produced in only a portion of this period.

Secondly, we have all operating charges and upkeep. These will run fairly uniform through the operating period regardless of the fluctuating period in output. The repair charges will certainly run over into the non-operating season and will vary from year to year quite considerably.

"Slack" and "Profit" Months

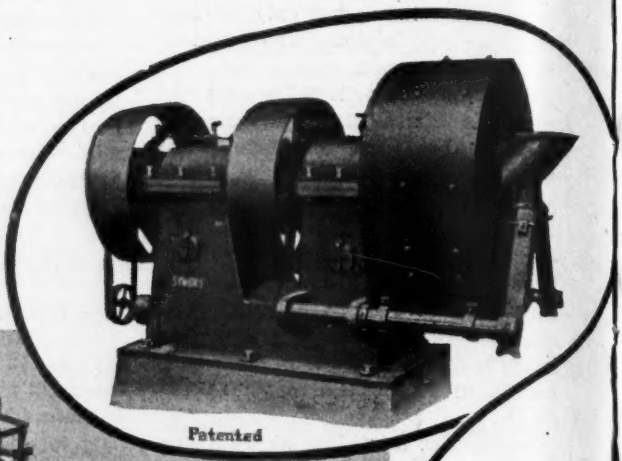
If a proper set of books is opened a monthly statement can be obtained which will give the exact costs for such period of time. With this system the profit and loss for each month will be shown, and it is needless to say that certain months will show a loss, regardless of the success of operation. In cost accounting, it is these non-productive or "slack" months that upset the calculations, as they reflect directly against the profit months and must therefore be averaged against them. Therefore, in the writer's opinion, the correct cost of production in the sand and gravel business can only be arrived at in operation covering the full twelve months' period.

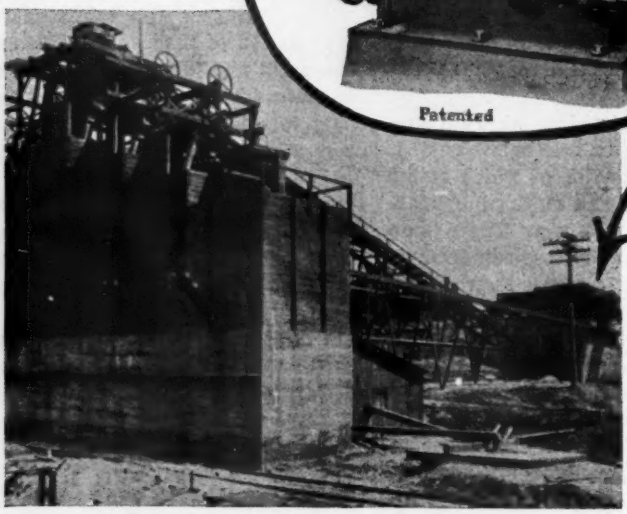
Statement of Operations

The general cash book should be so constructed that all distribution of accounts are automatically carried. It is a simple matter, then, at the end of each month and twelve months' period, to make up a cost sheet which should carry substantially the items in the accompanying statement of operations.

(Continued on page 108)

SYMONS DISC CRUSHER





Manufactured and Sold Only by

Chalmers & Williams

Chicago Heights, Ill.

Questionaire Sent to All Users, and One of the Answers

Q. Size crusher this report covers? Ans. ***24 inch.***

Q. Kind of material crushed? Ans. ***Hard heads.***

Q. What moisture in material? Ans. ***10%.***

Q. How long have you operated crusher? Ans. ***2 years.***

Q. What is size of feed? Ans. ***2 inches.***

Q. What is size of product? Ans. ***½ inch.***

Q. What horsepower does it require? Ans. ***20.***

Q. How many tons per hour does it crush? Ans. ***25.***

Q. How many tons do you crush per pair of discs? Ans. ***Have not replaced yet.***

Q. What percentage of time have you lost on account of breakage? Ans. ***None.***

Q. Give your opinion of this crusher as compared to rolls. Ans. ***Would not use rolls.***

Q. Give your opinion of this crusher as compared to a jaw crusher. Ans. ***Jaw crusher makes too many spalls.***

Q. Give your opinion of this crusher as compared to a gyratory crusher. Ans. ***Has much greater capacity.***

Signed, ***Name on Request.***

MANY MORE LIKE THIS, ALSO REPORTS OF THE SUCCESS OF THE CRUSHER ON DIFFERENT KINDS OF MATERIAL.

(Continued from page 105)

Statement of Operations

SHIPMENTS LESS ALLOWANCES			$.....
MANUFACTURING AND DELIVERY			
(If retail business is conducted)			
Labor		$.....	
Supplies and Repairs, equipment		$.....	
Supplies and Repairs, Delivery, equipment		$.....	
Fuel		$.....	
Power (if electricity is used)		$.....	
Delivery or hauling charges		$.....	
Salary of head of manufacturing department		$.....	
Insurance		$.....	
Total		$.....	
Depreciation and Depletion, or royalties:			
Land	$.....		
Equipment	$.....		
Royalties	$.....		
Delivery equipment	$.....	$.....	$.....
			$.....
Increase in Inventory:			
(Stock on hand, either machinery or sand and gravel)			$.....
Manufacturing Profit			$.....
General and Selling Expense and Interest:			
Sales, Salaries and Expense		$.....	
Salaries—General		$.....	
Office Supplies		$.....	
Interest and Exchange		$.....	
Incorporation Expenses		$.....	
Advertising		$.....	
Licenses, Dues and Fees		$.....	
Taxes Paid		$.....	
Telephone and Telegraph		$.....	
Office rents		$.....	
Stamps		$.....	
Audits		$.....	
Miscellaneous		$.....	$.....
Surplus			$.....

This statement is merely the general outline and is subject to change to suit individual requirements. From the total of Manufacturing, Selling and General Expenses can be derived the cost per ton of output for the previous year. It is seen at a glance that the cost is derived from the year past, and if the price has been too low it will be shown by the loss account. What, then, is the remedy? The price must be fixed, giving a fair margin of profit on estimated tonnage.

Car Shortage Has Raised Unit Production Cost

It has undoubtedly been very apparent to those who have figured the balance sheet for the past year that decreased production caused by car shortage has very materially raised their unit cost of production. In the face of the present crisis we will have to estimate as best we can on tonnage possibilities for the future and base our prices accordingly. We do not wish to profiteer by the shortage of

transportation equipment and the demand for material available, as the immediate future of the building industry will depend upon the prices of building materials very largely. It behooves every producer and dealer in building materials to plan on as small a margin as will give him a safe return on his investment, or we may find ourselves with no market whatever.

It is doubly important under these conditions that we KNOW OUR COSTS.

Methods of Stripping Quarries

By D. J. HAUER, C. E.

No matter what method of stripping the ledge is used, careful consideration should be given to where the spoil should be placed. Too frequently it is deposited when it is in the way of future stripping operations or in the logical development of the quarry. Thus it is necessary to plan the development of a quarry for many years in advance so that all the operations can be co-ordinated with one another. The method of deciding upon the operations and developments from week to week or month to month is expensive and prevents the most economical development. This, though, is another subject and will be treated in other articles.

THERE ARE TWO general methods of stripping stone ledges for quarry operations. The older and one in most common use in the past is that of throwing the overburden into the quarry pit or upon the quarry floor with the blasting of the rock, and afterwards removing it by hand methods as the blasted stone is picked up, carrying the earth and decomposed rock to spoil banks.

The second method is to strip the ledge of all dirt overburden by some method, thus disposing of it from the top and not allowing the dirt to go into the quarry to be rehandled. Generally, this last method is the cheapest and the most satisfactory, but in a few cases, the first method may have to be used and may prove economical.

In some quarries the operations are small and the capital is very limited, so that the quarryman cannot afford to expend much money to first strip a part of the ledge. He feels that each season's work must be paid for out of the income of that year, so that as the yardage of overburden for a season is small he can do the entire operation of quarrying and handling the overburden at one time. This may not be the most economical, but it may be the most practical.

Comparative Season Costs

To illustrate: A quarryman may be able to strip enough ledge for a season's work by the second method for $1,000 during the winter or early spring, while he is not operating his crusher plant, this being an expenditure when he has no income. If he operates his quarry for eight months this would be a monthly charge of $125, while by shooting the overburden down with the rock and handling

it as the rock is broken up and loaded may give an added cost of say a $175 average for each month. The total cost for the same work would be $1,400, as compared with $1,000, but the quarryman might not feel the charge of $175 a month, while to pay out $1,000 at one time in the spring might embarrass him financially for the entire year.

When the Overburden Is Light

Then, there are some quarries that have only a foot or two of earth over the solid rock, and the top of the rock is uneven and full of holes. If a drilling machine is used for drilling holes, then to strip the ledge may mean that the cost of moving, setting up and operating the drill may be greater than the cost of rehandling the small amount of overburden on the quarry floor. Then, again, it may not always he economical to clean out all the deep holes in the top of the ledge, as it may cost much more to do other work on the top of the ledge, or even the actual excavation of such holes may cost an excessive amount.

If the overburden is shot down into the quarry pit there are several methods of picking it up. The oldest way is by pick and shovel. Scrapers of any kind can seldom be used as the dirt is mixed up with the rock. For this reason most of the dirt is handled in the same manner as the stone, that is, if the stone is picked up by hand the dirt is handled in the same manner, while if a steam shovel is used on the stone it is also used for the dirt.

Removal of Dirt

The great trouble in using machinery is that the dirt at times is so thoroughly mixed with the stone that some dirt cannot be separated from the stone in the quarry and must be loaded with it. This means that the dirt may go into the crushers. If the amount is small as compared to the total output of the crushers and the crusher screenings are not used, this makes little difference, but if the screenings are sold and must be kept clean, as is frequently the case today, then the dirt and overburden must be kept out of the crushers. This can be cheaply accomplished by dumping the stone over a grillage of bars or old screens, allowing the dirt to fall through before reaching the crushers. This dirt as it accumulates can be hauled away or it can fall into a hopper under the grill and onto some type of conveyor that would deposit it on a spoil bank, thus disposing of it in a cheap manner.

It can be seen that unless the ledge is actually stripped before any blasting or removal of the rock is done, there is always some trouble in disposing of the overburden and the cost of the stripping is mixed up with the blasting or rock loosening and that of picking up the rock, thus making it advisable, except in unusual circumstances, to first strip the ledge.

There are a number of methods of doing this work. At one time it was common to load one-horse dump carts, which were used to haul stone to the crusher during the season, with picks and shovels in the hands of men, and haul the spoil to one side and place it in a bank. When cars took the place of carts in the quarries, some quarrymen continued the use of carts for stripping, while others have substituted dump wagons. Today there are still some carts used for this purpose and many wagons. The latter are much more economical than the one-horse dump carts, even when one driver may care for and drive from two to four carts, which is sometimes done.

As a rule the most expensive way of hauling dirt, especially for a distance

greater than 400 or 500 feet, is in dump carts. If dump wagons are used it is possible in many cases to use two or more wagons to one team of horses, changing the horses on the ledge from the empty to the loaded wagons, thus saving a large sum in the cost of the excavation.

USE OF SCRAPERS

Scrapers will usually strip a ledge at a lower cost than hand methods and dump wagons. Drag scrapers have been used in many cases, but they are seldom economical, for the limit of the haul that can be made at a fair cost is not over 100 feet. They can be used to load wagons or cars from a platform through a trap. The loading platform, being moved from place to place, keeps the haul down to an economical one.

For a number of quarries drag scrap-

Special Screening Plants

THE OLD WAY of preparing sand and gravel for the market by hand, screening it through flat screens, has become obsolete and impractical in these days of keen competition. The natural resort is, of course, to power screening plants; but the varying conditions existent at different gravel banks makes it necessary, in many cases, to design special outfits, in order to obtain the best results.

The above cut illustrates a Reliance portable screening plant. The elevator is built to swing in a half circle before the bin, and the whole apparatus is mounted on wheels to run on a track. Power is supplied by a gasoline motor placed under the bin, out of the way and protected from the dirt and weather. The gravel and sand is simply broken down with shovels, and is automatically picked up by the elevator, screened and stored in the different pockets of the bin, ready to load by gravity into the small cars used for transportation.

ers have been used to strip ledges, from the face of the ledge from 50 to 100 feet. This can be done cheaply, simply piling the overburden back but it means an added cost later to the operation, for in another season when the ledge must again be stripped all of this dirt must again be handled either by the scrapers or by some other method. Drag scrapers, though, may be the only practical tool to dig out fissures or deep holes in the top

For any hauls more than 100 feet wheel scrapers can be used. With these the overburden can be disposed of for good—that is, so it may never have to be rehandled. The two-wheeled scrapers are under some disadvantages as compared to other methods due to the limited loads they carry.

This is an advantage of the four-wheeled scrapers, commonly called after the inventor, Maney scrapers. They carry a load of one cubic yard, with only two horses. Hauls can be made economically with Maneys up to half a mile. These scrapers are being used for quarry stripping and their use will increase as quarrymen learn of their value. Quarry stripping is generally done by attacking the excavation from the top, due in many cases to the fact that the depth of the overburden is limited and varies exceedingly over limited areas. The Maneys are ideal for such work. They can be loaded by horses, but some mechanical power is better as the load obtained is larger and the cost of loading is often less. Traction engines are used extensively in loading these scrapers and do well at it, but for quarry stripping the writer would favor a single drum hoisting engine as being both cheaper in first cost and in operation, yet just as effective.

Power scrapers can also be used in stripping operations. Such scrapers can be operated on a derrick over a limited area, but for extensive work there must be a derrick car. Such an outfit quickly runs into money, so that the capital invested may not be justified unless the stripping operation is an extensive one and must be carried on almost continually. Unless the dirt is loaded into either wagons or cars the material must be rehandled one or more times in order to get it into the spoil bank.

Cableways

For this reason it is better to operate a power scraper on a cableway. A rigid, regular-set-up cableway is too expensive and the area covered at any one set-up is too limited as compared to a slack cableway. There can be no question as to using a regular cableway, either with a power scraper or grab bucket, and in some cases such equipment would be economical; but the slack cableway for such work possesses many advantages over the other. With a cableway it is possible to strip the ledge and carry the spoil over the face of the rock and quarry floor and place it where it will never have to be moved, and where it may have a value in making valuable land for shops or other purposes.

Slack cableways are easily set up and charged and are not expensive to operate. With them it is possible to excavate deep holes and fissures in the top of the ledge. Not only is the excavation done but the transportation is covered with the same machine.

Steam shovels, or rather power shovels operated by steam, gasoline or electricity, are being used not only for stripping quarries but also for loading the blasted rock. When shovels are used for both, the larger types are generally installed, but when shovels are purchased for stripping only the smaller types are selected as it is easier to move them over the top of a ledge. With power shovels either

wagons or cars must be used to haul away the dirt. In many cases it is cheaper to use wagons than cars, but it is possible with the proper grades to send loaded cars to the spoil banks by gravity and pull back the empties by a hoisting engine.

Hydraulic Stripping

In some cases, and especially when the process can be used, the hydraulic or sluicing method of stripping quarries is the most economical. First of all, there must be an ample supply of water, as a high-power pump must be used and water supplied equal to from three to five times the volume of the dirt to be excavated. There must be pressure enough at the nozzle to tear loose the overburden and enough fall to carry the dirt in sluices or pipes to the spoil bank. The spoil bank must be so situated that the soft mud will not injure other property around it, and there must be some means of getting rid of the excess water from the spoil.

This method gives surprisingly low costs, for dirt and even rotten rock and boulders can be moved by this process.

The original cost of a plant is great, so that this method is not always profitable for small operations, but for large quarries it should certainly be employed if the conditions will allow it. Water cannot always be obtained from nearby streams, but at times in deep-pit quarries enough water may accumulate in the pit to furnish a supply for sluicing.

Fifty Per Cent Greater Output

HOW MANY sand producers are getting the greatest output possible from their sand banks. The J. E. Carroll Sand Company, Buffalo, N. Y., whose plant is at Attica, N. Y., thought that their hauling equipment was the speediest that could be purchased, but still the long arm of the Browning filled the cars faster than they could be taken away. Then came the gasoline locomotive early last year. It's a Fate, and volumes could be written about that "peppy" little worker. Carroll, however, is short on words and long on deeds, and merely said, "We have increased our output fifty per cent over former years, with a lower cost price per yard. It operates quickly and efficiently." He said somehing, at that!

Chain vs. Belt in Elevators

By MINER RAYMOND

Any attempt to formulate rules governing the choice between chain and belt as a carrying medium for buckets in an elevator is very much like the attempted answers to questions appearing in the health columns of some of our larger daily papers. They tell you to take a dose of castor oil, gargle your throat, take a hot bath and then consult a specialist. The safest law to follow in deciding between chain and belt for any particular elevator is, first, to determine all the local conditions, and then put your problem up to an expert—but be sure the man or firm chosen to receive your confidences is deserving of your confidence. However, it seems possible to reach certain conclusions by examining sets of conditions that are fairly typical, and that is the basis of this article. Before going further, it may be well to state that the conditions and specifications here assumed and conclusions reached are not the theoretical views of any one person, but represent a consensus of the opinions and experiences of many plant superintendents coupled with more than ten years' experience of the author in the desgin and manufacture of elevators of all kinds for plants large and small.

[Editor's Note: An invitation was extended in a recent issue to those having experience in the use of belt and chain elevators to discuss comparative merits. Mr. Raymond's article is the first received. The opportunity is still open.]

IN CONSIDERING our problem, let us assume three elevators which approximate one or more of the conditions to be met in nearly every sand and gravel or crushed stone plant.

1. Let the first be an elevator to handle a maximum of 35 tons of fairly dry sand per hour.

2. The second to have a capacity of 65 tons per hour of crushed stone, 1½ inches and under.

3. The third the big supply elevator carrying 100 to 200 tons of sand, gravel and stone to the screens either from the pit or crusher.

To specify further, assume that the first elevator is of the high-speed, centrifugal-discharge type, using 10x6 buckets of malleable iron or heavy steel, and assume that the other two are of the slow-moving, continuous type, the smaller to have one strand of chain or a belt carrying 14x7x12 buckets and the bigger one to have 24x10x12 buckets either mounted on a belt or travelling between two strands of steel roller chain.

Explanation of the Table

With these specifications fixed, let's examine the elevators, which we will call Nos. 1, 2 and 3 in the order described, from the standpoints of first cost, maintenance or upkeep, life and correct design. For the first comparison a table is given showing relative selling prices of both chain and belt elevators of the selected types not only

Description of Elevator.	*Cost on Chain.*	*Cost on Belt.*
No. 1. 10x6 centrifugal discharge buckets on single strand of combination chain or 4-ply rubber belt, to handle (max.) 35 tons sand per hour, 50-foot centers.	209 *100*	193 *105*
No. 2. 14x7x12 continuous type steel buckets on single strand combination chain or 5-ply rubber belt, to handle (max.) 60 tons crushed stone per hour, 50-foot centers.	314 *100*	338 *117*
No. 3. 24x10x12 continuous type steel buckets on double strand steel bar roller chain or 10-ply rubber belt, to handle (max.) 190 tons sand, gravel and crushed rock per hour, 50-foot centers.	358 *100*	376 *130*

as of Sept. 1, 1917, before the Government took a hand in the metal markets, but also as of Sept. 1, 1915, the reason for the two dates being apparent when it is recalled that while malleable and steel chains cost from two to two and one-half times as much on the latter date as they did two years before, belting has advanced in a ratio only one-fourth as great—namely, from 40 to 60 per cent. For uniformity, rubber belt has been chosen to represent the belting side of the question, but if we had selected a good textile belt instead, the resulting comparisons would not be materially changed. The selection of rubber belt is not to be construed as an argument in its favor and against a high-grade canvas belt. Each has its advantages under certain conditions.

The table shows today's prices in plain type and *1915 prices in italics.* For obvious reasons, the exact dollars and cents are not given but the figures are relatively correct on a percentage basis, the lowest price in each group being arbitrarily set at 100 per cent, with the rest in proportion.

From the table it appears that chain has the advantage in first cost except in the case of No. 1 today, while the difference in cost of No. 1 two years ago was very small. In other words, given a properly designed elevator, the chain is cheaper in first cost than belt except in the small, speedy centrifugal discharge elevators.

Service and Upkeep

So much for first cost. Which lasts longer and costs less to keep in good working order? The answer to that question can only be found in the experiences of actual users, for the reason that life and maintenance expense depend absolutely on the conditions under which it works, the care with which it was installed and the attention it receives. It is just as true of elevators as of any other machinery that the lack of a dollar's worth of oil or grease has ruined many hundred dollars' worth of steel and iron. For our purposes we will assume a correct installation and good care, and can safely say that where the service is not severe in cases Nos. 1 and 2 both chain and belt should give good service and last a long time. It is hard to say which would last the longer, although belts have the advantage at higher speeds running smoothly over the circumference of the pulley, while the chain links form a series of chords on the pitch line of the sprockets or trac-

tion wheels. In case of accident, however, a bucket or two torn off the belt means a sliced belt, in contrast to the renewal of a link or two of the chain. The only advantage that can be claimed by chain is that the belt can be spliced or pieced out but two or three times before a whole new belt is required, whereas any number of new links can be inserted in the chain any number of times without any ill effects. It is a case of progressive renewal against a complete replacement after two or three repairs.

Furthermore, the belt wears as a whole while the chains ordinarily used in elevators handling sand or fine stone are so made that the wearing parts, such as pins and bushings, can be easily renewed and the purchase of a complete new chain is avoided.

From the standpoint of design, some engineers prefer chain for heavily loaded elevators on the basis that the center of gravity of a full bucket is some distance from the centerline of the chain or belt and the strain thus imposed on the bolts is better carried by the bolt sizes and spacings customary with chain, than by the usual belt method of a single row or two rows close together, of small belt bolts.

The foregoing remarks apply mainly to cases 1 and 2, and can be summed up into a choice of belt for fast centrifugal discharge elevators in light service while chain is probably preferable with the slower continuous buckets. The word "probably" is used advisedly as for elevators of the type of No. 2, both chain and belt have ardent advocates among men whose experience should insure respect for their judgments. There are many quarries in the North where belts have a long lead, while carload after carload of chain moves South every year for use in the phosphate rock plants where it is to be used on both centrifugal and continuous elevators.

In the big elevators such as are typified by No. 3, chain has a marked advantage, and is being adopted more broadly each year; and in this connection please understand that reference is made not to chain in general but to a particular kind of chain. More and more of the bigger elevators are being changed over from belt to a double strand of steel bar chain with steel pins operating in rollers provided with case-hardened bushings.

To return to our problem, the reduction of these considerations to a set of rules governing the choice between belt and chain works out something as follows:

Rule 1. For elevators similar to type No. 1, use belt.

Rule 2. For elevators similar to type No. 2, use either.

Rule 3. For elevators similar to type No. 3, use a double strand of steel bar roller chain.

Rule 4. To be safe and sure, in every case consult a specialist. Elevator manufacturers will give you good advice and charge nothing for recommendation and estimate.

Mr. Hauer's Article.

Despite the great amount of care taken in the handling of type there crept into the January issue a serious error in the arrangement of Mr. D. J. Hauer's valuable article "Cost Keeping for Quarries." In answer to numerous inquiries, and for the information of those who did not write, the following explanation is made:

The article begins on page 61, continues to top of page 62, embraces page 63, is carried to the right-hand column of page 76, includes the bottom four lines of the left-hand column on page 77 and ends at the top of the right-hand column on that page. A determined effort will be made to prevent future occurrences of this kind.

Motor Trucks in Louisville

By A. W. WILLIAMS.

Some concerns feature the sand and gravel business in the summer and the coal business in the winter, thereby keeping all delivery equipment going the year around, but this is not advisable except with motor equipment. Horse-drawn vehicles can't begin to handle the number of trips that the trucks can, nor handle the heavy tonnage loads, and from every angle the truck has proven a money saver for the sand and gravel dealer.

SEVEN TRUCKS with seven drivers as against twenty wagons with twenty drivers means a big saving in manpower, which is scarce and high for all grades. Again, the truck makes the average trip in less than one-fourth of the time required by animals, which in either bad weather or excessively hot weather can't be taken faster than a walk. On long suburban runs the horse-drawn vehicle is out of the question, especially when the weather and roads are not just right, but weather or distance means little to the big truck, and on trucks where cabs or proper protection is afforded the driver, the latter is in much better shape to handle his work than on the old-style open wagon. The closed cabs have proven a great advantage, and many are now equipped so that the cab may be removed in the summer when not needed.

Character of Drivers

In hiring drivers for its trucks the Ohio River Sand Co., Louisville, Ky., has picked the very best men that it could find. No boys or flighty youngsters are found on its trucks, but big, husky, mature men, who in an emergency can think, and have the power to set a brake. A big truck with a heavy load is a liability in the hands of a poor driver, and accident costs will eat the owner up. However, better men cost a little more, but they can be counted upon to make quick deliveries and at the same time keep the company out of litigation, whereas it is not uncommon to see a couple of youngsters racing big trucks down a public highway, something that is very hard on the trucks, and at the same time very dangerous from the company's as well as the public's standpoint.

During the past summer when railroad equipment was very scarce and the company was having trouble in getting sand and gravel from its riverside station to the sub-station, four or five miles away, the trucks were kept busy in hauling material to the substation when not needed for deliveries. This enabled the company to keep all of its trucks operating to capacity, and kept the supply on hand at the sub-station up to normal in spite of the traffic troubles.

This company maintains its own repair shop, and carries many parts in stock, this enabling the shop foreman to make quick repairs by assembling parts when needed. By operating a fleet of trucks of one make the operator is enabled to obtain discounts on repair parts, and through being able to interchange parts, and have them on hand much valuable time is saved when something does go wrong.

(Continued on page 123)

MEN AND MACHINERY

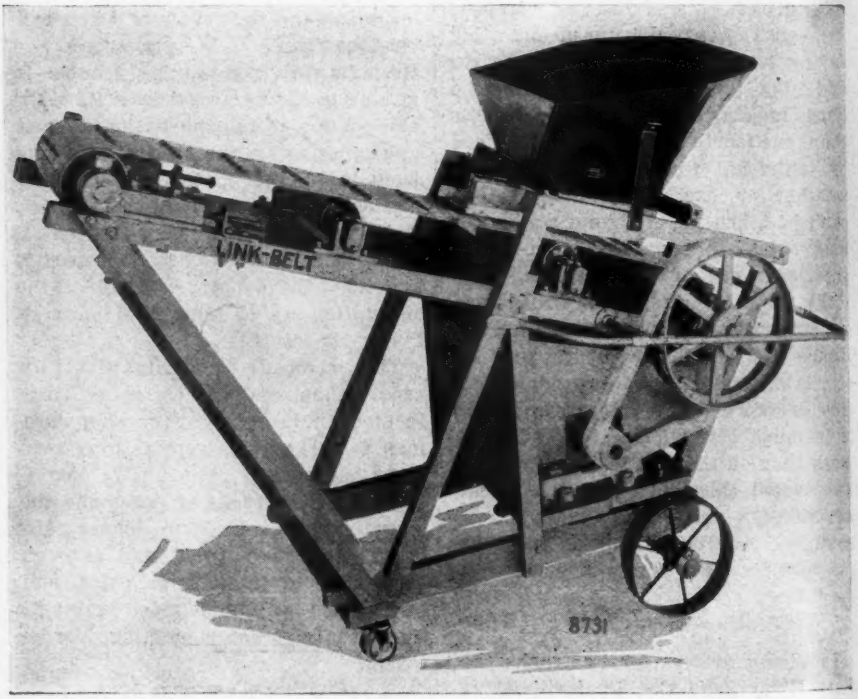
Speedy Box Car Loader

THE LINK BELT CO., of Nicetown, Philadelphia, Pa., has recently placed on the market a low-priced machine for loading all kinds of material into box cars. The machine is shown by the half-tone illustration, which is almost self-explanatory. It is called the Link-Belt BX loader, is a portable machine, driven by motor or gas engine, and handles the material delivered to it through the steel hopper, on a flat belt.

On a recent test it loaded 80 box cars in six days with but two men. Its capacity is 80 to 100 tons per hour. When we consider that it will take three men at least two and one-half hours to load one car, and compare this with the speed at which the Link-Belt BX loader will do the same work (two men and the loader can load one box car in 35 minutes) an idea can be obtained as to the usefulness of this device. The machine is priced at $600 complete with motor or gas engine, f. o. b. Nicetown.

Railroads Advocate Fast Unloading Devices.

EVIDENCE of the strenuous efforts of railroad officials to keep cars moving and relieve freight congestion is found in their growing interest in all devices designed for rapid unloading of cars at team tracks and sidings. Recently a New Jersey contractor, Conrad Sebolt, receiving crushed stone in cars on the P. R. R. at New Bruns-



MACHINE WHICH LOADS ALL KINDS OF MATERIAL INTO BOX CARS

wick, N. J., purchased a Lee Loader for the rapid transference of stone into his motor truck. It was the first such device in town.

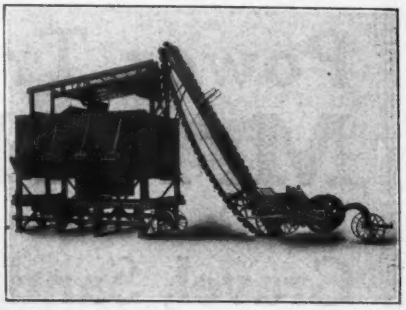
J. H. Herron, the freight agent at New Brunswick, after watching the operation of the loader for a short time and noting the speed at which Mr. Sebolt unloaded his stone, became decidedly interested. Learning from the contractor the address of the manufacturer, Mr. Herron wrote for

UNLOADING DEVICE FOR RAPID TRANSFERENCE OF STONE TO HAULING EQUIPMENT.

information and catalogs and distributed the latter among all of the contractors, coal dealers and industrial concerns receiving material at the New Brunswick sidings.

Portable Crushing Outfit.

THE SCARCITY of labor, the congestion of railroad traffic and the ruling against the shipping of aggregates in open cars have all operated to make more difficult and expensive the production of crushed stone. These same conditions, however, have opened up opportunities for owners of small quarries. For a number of years past the small quarry could not successfully compete with the large



STEEL FRAME ROCK CRUSHER, MOUNTED WITH FOLDING ELEVATOR, REVOLVING SCREENS AND PORTABLE BINS.

one on account of lack of improved methods of production.

Owners of small quarries, by investing a moderate sum in a portable crushing outfit lke the one shown in the accompanying illustration, can undoubtedly take advantage of the present situation and dispose of considerable quantities of crushed stone at good prices.

The illustration shows a Fort Wayne steel frame rock crusher mounted on a four-wheeled truck with an elevator, a revolving screen and a portable stone bin. A plant of this kind can be set up for permanent use or it can be readily moved from point to point. The crusher is made in a number of different sizes having daily capacities of from 60 to 300 tons. The elevation and screen are furnished any size that may be desired. It is manufactured by the Good Roads Machinery Company, Inc., Fort Wayne, Ind.

Henry B. Alvord has been appointed secretary of the American Concrete Institute, to succeed Harold D. Hynds, who resigned to join the Engineering corps of the army. Mr. Alvord has been administrative assistant for nearly a year. He is connected with the Aberthaw Construction Company, of Boston, and will continue his present duties.

Elevating, Conveying
and
Power Transmitting
MACHINERY
for
Gravel, Sand *and* Stone Plants

SCREW AND BELT CONVEYORS.

BUCKET ELEVATORS, with buckets on chain or belt, furnished with or without steel casings.

BUCKETS — standard types in steel or malleable iron, steel buckets of special design made to your specifications.

GEARS—MACHINE MOLDED or with CUT TEETH.

CHILLED RIM SPROCKETS.

CHAIN—standard malleable detachable, Ley bushed, steel or malleable roller.

SHAFTING, PULLEYS, BEARINGS, FRICTION CLUTCHES.

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H. W. Caldwell & Son Co.
CHICAGO
Western Avenue, 17th and 18th Streets

PRACTICAL SIDE LINES

Concrete Products Offer Winter Activity.

When winter sets in and the pits are frozen, sand and gravel producers have to transfer some men to other activities and have little or no business to absorb overhead charges during four or five months of each year. What can be done by the men around these plants is the question now receiving considerable attention. In other words, wasted time and wasted investment are by-products of the sand and gravel producing business.

BY J. H. LIBBERTON,
Secretary, American Concrete Pipe Association.

IN CONNECTION with my work as secretary of the American Concrete Pipe Association I have come in contact with many of the successful sand and gravel producers. Several of them have been thinking about the manufacture of concrete products as a possible winter activity. A brief outline of the possibilities should be given consideration by sand and gravel producers who are so situated as to be able to market a well-made concrete product and not interfere with the regular activities of their products manufacturing customers.

Study Needs of Surrounding Territory.

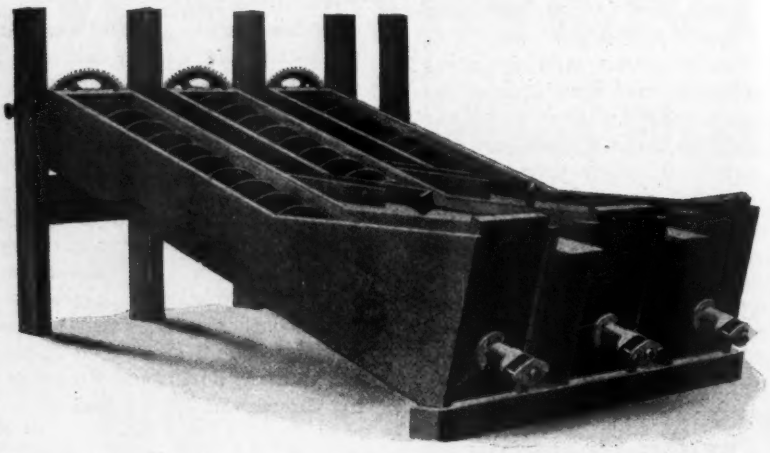
Among the concrete products which might be profitably considered are concrete drain tile, concrete silo staves, concrete burial vaults, fence posts and building blocks. The advisability of going into the business should be studied from the needs of the territory in which you can profitably ship. Drain tile and silo staves are now considered in the class of agricultural necessities. No farmer can farm most efficiently without tile drainage, and no feeder or dairyman can profitably get along without silos. This puts especial sales value on these two products. By storing up a large quantity of proper material in the fall at your plant or at a convenient shipping location, you will be able to utilize your men throughout the entire winter months. Salesmen or sales agencies should be able to dispose of the products during the winter or during the regular selling season.

Not Practicable for All Producers

I do not wish to be quoted as recommending the concrete products business for all sand and gravel producers, as there are certainly some locations and some conditions which should be carefully studied with regard to the possibilities for marketing the product. Survey of the conditions would include, in case of silo staves and drain tile, an estimate of the farming acreage into which you could profitably ship, amount of tile supplied annually in the case of drain tile, and estimates of the number of farms and the number of cattle in the case of silo staves. This would give you an idea of what you can expect as your share of the business in the territory handling it on an equivalent commercial scale. Information in detail will be furnished to any inquirer upon request.

"LEWISTOWN"

Sand Washers



Are Used More Extensively Than Any Other Washers

In The Preparation Of Glass Sand

If you have a hard problem, consult us, we will help you to solve it.

We estimate on complete sand plants and manufacture a full line of Crushing, Grinding, Screening, Washing, Drying and Conveying Machinery.

Just show us your material. We will do the rest.

Lewistown Foundry & Machine Company

LEWISTOWN, PA.

Motor Trucks in Louisville.

(Continued from page 117)

MOTOR TRUCKS HAVE MANY USES

Other sand companies in Louisville and vicinity have decided that the truck is a big-saving device, and trucks are being used by the E. T. Slider Co., and other concerns to advantage. The Slider company handles coal as well as sand and gravel, operating a barge line up the Ohio to bring coal to Louisville and New Albany, and finds that the coal business breaks in just when the sand and gravel business is letting up for the winter. Its barges and towboats are also kept busy in the same way, which means a big saving over the year.

That replacement is not necessary very often is shown in the case of an old truck used by a general transfer company in Louisville. This truck is used for handling sand, gravel, crushed rock, bricks, cinders and a little bit of everything. An old picture of this truck, taken some five years ago, appeared as though the truck was on its last legs, but this appearance is deceptive, and the truck is as good today as it was then, although it needs paint and a little work. It has been handling heavy duty service for eight years, and the owner expects to get many more years of service out of it before it is scrapped.

Coming Meetings.

February 4-7. — American Road Builders' Association. Hotel Statler, St. Louis, Mo.

February 7-8. — National Crushed Stone Association. La Salle Hotel, Chicago, Ill. F. W. Connell, Hume-Mansur Building, Indianapolis, Ind., Temporary Secretary.

February 7-8. — National Association of Sand and Gravel Producers, Great Northern Hotel, Chicago, Illinois. E. Guy Sutton, care Carmichael Gravel Co., Williamsport, Ind., Secretary.

February 7-8-9. — American Concrete Institute. Hotel La Salle, Chicago, Ill. Henry B. Alford, care Aberthaw Construction Co., Boston, Mass., Secretary.

February 8-9.—American Concrete Pipe Association. Hotel Sherman, Chicago, Ill. J. H. Libberton, Secretary, 210 S. La Salle St., Chicago, Ill.

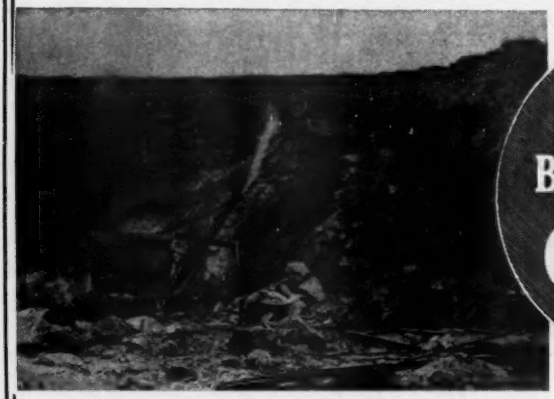
March 7-8.—Iowa Sand and Gravel Producers' Association, Chamberlain Hotel, Des Moines, Iowa. W. R. Webster, care Ideal Sand and Gravel Co., Mason City, Iowa, Secretary-Treasurer.

No Machinery Exhibit at Road Convention.

In order to not interfere with the transportation of materials needed for war purposes it has been decided to abandon the exhibit of road building machinery, materials and appliances which, for a number of years, has been an important feature of the association's convention.

The meeting will take place February 4-7 at the Hotel Statler, St. Louis, Mo. The exhibit will be limited to photographs, models, literature, etc., as can be shown in the large ball room of the hotel.

The motor truck has substantially proved its economy in sections where road maintenance is given due importance. One man with a truck is able to do more than twice the maintenance work he could perform without it, and in addition can give the road constant attention so as to eliminate the periodic resurfacing necessary when the roads are not repaired as frequently as holes and cracks appear.



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OSGOOD "18"

¾-Yard Traction Revolving Steam Shovels

The picture illustrates how the OSGOOD "18" ¾-yard Traction Revolving Steam Shovels are being used for heavy Quarry Work. They are built along the same lines as the heavier and more powerful OSGOOD shovels, in that they have horizontal hoisting engines, double geared shipper shaft, strong armored boom and dipper handle, machine cut teeth, bronze bushed bearings, etc.

Let us tell you what they have done for others; the best evidence of what they will do for you.

The Osgood Company
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Track Equipment

A complete line of frogs, switches, crossings, crossovers, switch stands, etc.

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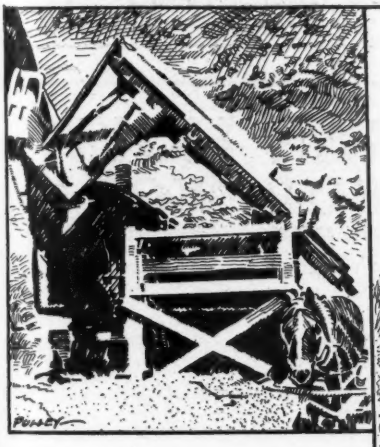
The Cincinnati Frog & Switch Company
Track Equipment for Steam and Electric Railroads, Mines & Factories
Cincinnati, O.

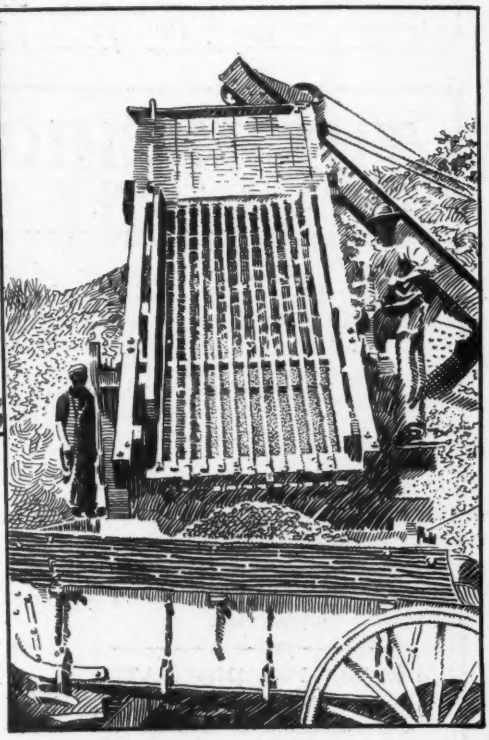
Gravel Loaded and Graded in One Operation

AT ONE SECTION of a 5½-mile macadam road being built by Fred E. Ellis, of Melrose, Mass., between Castleton and Brookview, Albany county, N. Y., a gravel sub-base was necessary. This required a rather coarser gravel and made it necessary to screen the gravel from the pit. To avoid handling the material twice the contractor evolved a tipping screen that could be worked by the shovel with small loss of time. The shovel, a Type O Thew with a ¾-yard dipper, could not raise the material more than 10 feet. Not desiring to purchase an extra boom, a screen hinged at one end, 10 feet high, on which the shovel deposited the gravel, was built. This screen is further described in a recent issue of Municipal Journal, as follows:

The dipper was then lowered, caught onto the screen near the bottom and raised, allowing the coarser gravel to slide over the screen and into the truck, the fine material falling through the screen. This fine material was shoveled to one side by two men and placed within reach of the shovel. At intervals it was loaded into wagons and carted away for filling.

The screen was 10 feet long and 4 feet wide, built in two parts. An upper screen was composed of half-inch water pipe, 10 feet long, the pipes being about 3 inches apart. This was to





ABOVE—SIDE VIEW OF SCREEN LIFTED FOR DUMPING.

AT RIGHT—FRONT VIEW OF SCREEN TIPPED FOR DUMPING.

Blooie!

Goes the Fuse—

One blown fuse may tie up your plant—unless you constantly carry a reserve stock of new fuses.
That's expensive—and you are taking chances on being without a fuse the very time you need it most.
There's *always* a fuse on hand when you use

Daum Renewable Fuses

"For Electric Light and Power"

The Daum cartridge may be refilled over and over. Break off a little of **Daum Fuse-Strip,** insert in the cartridge—and you have a new fuse.
No tools needed—takes but a minute—costs far less than an ordinary fuse—and is security against delays. Write for bulletin and prices.

A. F. Daum, Pittsburg, Pa.

Sole Manufacturer

Representatives—Chicago, Squire-Cogswell Co., Ellsworth Bldg.; San Francisco, Geo. H. Trask, 76 Sacramento Street; Pittsburgh, Armstrong & White.

THE MICHIGAN HOIST IS A GIANT FOR WORK

It is a time and money saver in heavy dock work and stationary hoisting of all kinds. Occupies only five square feet of floor space.

Operated with one lever and is instantly reversible. Equipped with a friction for fast lowering if desired.

Built for long service and hard wear. The two cylinders have well-fitted, easy-running pistons and all connecting rods and crank are made of the best steel obtainable.

All bearings heavily babbitted—driving gears are perfectly fitted and lined up so as to run smoothly, properly shielded by guards.

The two winch spools are 10 inches long—the drum is 14 by 26½.

We can make prompt shipment if we receive your order soon.

READY FOR IMMEDIATE SHIPMENT

Yours for Hoisting Service

Michigan Dredge Co.

Bay City, Mich.

break up the clods and prevent the larger stones from injuring the lower screen, placed a foot underneath. This lower screen was Clinton wire cloth with a mesh about ½ inch by 6 inches. At one end was built a board platform on which the shovel dumped. Under the other end stood the truck to be loaded.

The screen proper was supported at one end by a standard of 2x4's built under the platform, and at a point about 2 feet from the other end by a piece of shafting fastened to the screen frame, which was made of 2x6 timbers, with a U-bolt, and supported on a frame of 2x4's mounted on skids. The top of the pipe part of the screen was 10 feet above ground level.

At the bottom of the standard under the platform was fastened a short section of chain. The shovel dumped a dipperful on the platform, lowered the dipper to the chain, which was fastened to a tooth of the dipper, and raised the platform end of the screen about ten feet in the air. This revolved the screen about the shafting, bringing it to an angle of 45 degrees and allowing the gravel retained by the screen to slide into the truck. In this way the gravel could be screened with little delay and at a very low cost.

The method of laying the macadam is practically the same as that usually followed. Two Buffalo Pitts rollers were used on this work.

Quarry Regiment Still Needs Men.

Skilled men are needed in the quarrymen's regiment—28th engineers—for the following work: Drill runners, powdermen, engineers, machinists, compressor runners, blacksmiths, steam shovel operators, tunnel men, superintendents, hand drillers, timbermen, firemen, electricians, hoist runners, tool sharpeners, trackmen, laborers and foremen. Wages range from $33 to $60 a month when abroad.

The government is asking quarry owners to spare from one to three men, which would give a sufficient number to fill the regiment, and to advise a few of the skilled men, without dependents, to enlist in this special quarry regiment. Application may be made to Commanding Officer, 28th Engineers, Office of Chief of Engineers, War Department, Washington, D. C.

No Cement Show This Year.

Officials of the Contractor's and Builders' Show, scheduled to take the place and dates of the annual Cement Show, February 6-13, at the Coliseum, Chicago, Ill., have withdrawn the big exhibition this year. The transportation of the ponderous machinery usually exhibited would require a large number of railroad cars needed for carrying war supplies, and it was felt that the show should be postponed until condition were not so unsettled.

How to Test Manila Rope.

Rope is made from hard fibres such as manila, sisal and New Zealand hemp. A test has been adopted by the U. S. Bureau of Standards which consists in freeing the rope from oil, soaking it for 20 seconds in a solution of bleaching powder acidulated with acetic acid, rinsing in water, then in alcohol and finally exposing for a minute to the fumes of ammonia. Manila fibre turns russet brown, while all other ropes turn cherry red. Manila is claimed to be the best, for one reason because of its resistance to mildew.

Lime Production

During 1916, 4,083,803 short tons of lime were used in the United States. The value was $18,618,816. This amount was 460,915 tons over 1915, or more than 12 per cent in quantity, and $4,194,780, or 29 per cent in value. This was the first year in which the marketed production of lime equaled or exceeded 4,000,000 tons, as shown by the accompanying table.

	Quantity (short tons)	Value*	Av. price per ton	No. of plants in operation
1907	3,092,524	$12,656,705	$4.09	899
1908	2,766,873	11,091,186	4.01	949
1909	3,484,974	13,846,072	3.98	1,232
1910	3,505,954	14,088,039	4.02	1,125
1911	3,392,915	13,689,054	4.03	1,139
1912	3,529,462	13,970,114	3.96	1,017
1913	3,595,390	14,648,362	4.07	1,023
1914	3,380,928	13,268,938	3.92	954
1915	†3,622,810	†14,424,036	†3.98	906
1916	4,083,803	18,618,816	4.56	778
Percentage of increase in 1916:				12.3, 29.1.

*The value given represents the value of bulk lime f. o. b. at point of shipment and does not include weight or cost of barrel or package.
†Revised.

The record figures would have been even greater were it not for high cost of supplies, scarcity of labor, strikes, scarcity of railway cars in many parts of the country, and fuel shortage.

Ballast Handled Like Concrete.

The Pittsburgh Railways Co. piles ballast in its East Liberty storage yard with the aid of steel chutes, such as are used in delivering concrete from tower hoppers into forms. The freight cars dump into the hopper under the track, from which the material is picked up by a bucket, hoisted up an inclined track and dumps automatically into a small hopper such as is used on concrete work. The ballast is delivered from this hopper through steel chutes, as in chuting concrete, into stock piles.

Georgia's Sand-Clay Roads.

Muscogee county, Ga., has built some very good sand-clay roads costing from $200 to $1,000 per mile. Coarse, sharp sand with small gravel and tenacious clay mixed in the proportion of 75 and 25 per cent respectively, were the materials employed.

Convict labor was used. Georgia furnishes convicts free to the counties for road work and felony convicts of the state are apportioned according to population. Misdemeanor convicts remain in the county. The cost of convicts to Muscogee county is 60 cents per day each. Gangs of 20 to 25 men, 1 foreman, 2 day guards, 1 night guard, 16 mules and the necessary machinery averaged $30 per day, including upkeep. The county will spend $75,000 for road improvements during 1918.

FOR SALE
LOOKOUT FOR 1918

30" and 24" Symons Disc Crushers.
300 H. P. A. C. slip ring motor.
12x5' Silex lined tube mill with pebbles.
2 No. 6 McCully Crushers with screens and elevators.
25 new 80,000 cap. gondola cars.
2XX Williams Pulverizer Mill.
8 12 and 10 6 yd S. G. dump cars.
8¼x10 D. C. D. D. hoist engine.
80 ft. Duplex Belted Compressor.

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